2023 RTP - The role of lipid metabolism and signaling in pancreatic cancer: Intercellular communication and the immune escape

Status: **Open**
Applications open: 8/07/2022
Applications close: 18/08/2022

About this scholarship

Description/Applicant information

PROPOSAL AIMS
This project seeks to investigate the role of lipid signalling in the relationship between exosomes and cancer. This study will examine the lipidomic component of exosomes derived from pancreatic cancers. We hypothesise that the comprehensive characterisation and analysis of lipids will provide novel insight into the function of exosomes in the progression of pancreatic ductal adenocarcinoma (PDAC). Integration of these data will enhance our understanding of biological processes and pathways implicated in cancer. Additionally, the study will contribute to discovering non-invasive, quantifiable diagnostic methods and personalised treatment options for PDAC.

BACKGROUND
Pancreatic Ductal Adenocarcinoma (PDAC) is a highly aggressive solid malignancy with a late diagnosis and poor prognosis. This disease's rapid progression and invasivity are attributed to the intercellular communication between cells within the tumour microenvironment (TME). The crosstalk between tumour, stromal and infiltrating immune cells promotes disease progression, providing a supportive environment for cancer cells to grow while preventing effective anti-tumour immune responses.
The nanosized (30-150nm) class of extracellular vesicles, exosomes, have recently emerged for their participation in intercellular communication networks. Exosomes are produced in and released by cells under normal physiological conditions but can be dysregulated by changes in the intracellular and extracellular environment. These cell-derived particles inherit some structural and functional properties from the cell in which they are produced, thus serving as proxies of the parent cell. Once thought of as waste compartments, exosomes are now understood to facilitate the direct transfer of cellular cargoes, including proteins, lipids, nucleic acids (DNA, mRNA, and microRNA), and other bioactive species between cells in both physiological and pathophysiological scenarios. Tumour-derived exosomes play a significant role in transferring oncogenic cargoes to target cells in both the local environment and at distant sites. In this way, exosomes contribute to tumorigenic transformation, pre-metastatic niche formation, and immune evasion, thereby promoting disease progression.

RATIONALE
Exosomes have recently been employed in treating various cancers, serving to infiltrate and directly deliver therapeutic agents into the tumour. However, this remains unsuccessful in PDAC, given this disease's heterogeneous nature. Regardless, strategies to target exosomes show great promise for cancer diagnosis, prognosis, and treatment response. Thus, it is imperative that we fully understand their biological mode of action. While investigations into tumour-derived exosomes' proteomic and metabolomic profiles have attracted significant research attention, the lipidomic component has largely been overlooked. Lipids are a diverse molecular species, serving in membrane structure, energy metabolism, and signal transduction. Given this, we will use a multi-omics approach to investigate the involvement of lipid metabolism and signalling in the biogenesis and pathophysiological functions of exosomes. Understanding these interactions will provide an opportunity to further dissect the molecular interactions that occur within the TME and potentially lead to an uncovering of novel strategies for early identification and treatment of PDAC.

An Internship opportunity may also be available with this project.

Student type

- Future Students

Faculty

- Faculty of Health Sciences

Course type

- Higher Degree by Research

Citizenship

- Australian Citizen
- Australian Permanent Resident
- New Zealand Citizen
- Permanent Humanitarian Visa

Scholarship base

- Merit Based

Value

The annual scholarship package (stipend and tuition fees) is approx. $60,000 - $70,000 p.a.

Successful HDR applicants for admission will receive a 100% fee offset for up to 4 years, stipend scholarships, valued at $28,854 p.a. for up to a maximum of 3.5 years, are determined via a competitive selection process. Applicants will be notified of the scholarship outcome in November 2022.

For detailed information, visit: Research Training Program (RTP) Scholarships | Curtin University, Perth, Australia.

Scholarship Details

Maximum number awarded

1

Eligible courses

All applicable HDR courses

Eligibility criteria

We seek a highly motivated individual who is passionate about research. The candidate should display skillsets in the field of biomedical science, with experience in basic research practices and research literature. The candidate should have the flexibility to work in both team and individual environments and be willing to collaborate with peers.

Enrolment requirements

Eligible to enrol in a Higher Degree by Research Course at Curtin University by March 2023

How to apply

Application process

If this project excites you, and your research skills and experience are a good fit for this specific project, you should contact the Project Lead (listed below in the enquires section) via the **Expression of Interest (EOI) form.** ahead of the closing date.

Need more information?

Enquiries

To enquire about this project opportunity that includes a scholarship application, contact the Project lead, Professor Marco Falasca via the EOI form above.